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ABSTRACT

This study was part of a larger study which examined the association of such factors as mood, presence of physical symptoms, consumption of drugs and alcohol, exercise, weight-to-height ratio, number of hours of sleep, and social context on the type and amount of foods eaten at three meals each day for a sample of normal adults. This study focused primarily on the variability of subjects' reports of their physical and emotional well-being for each meal and the association of these variables with subjects' self-reported eating habits. Subjects (N=28), ranging in age from 20-72 years, responded to advertisements and flyers for the study. Subjects first completed an interview during which procedures were explained and subjects completed a demographic and health/diet history questionnaire. For the next 28 days, subjects recorded on a specially prepared, fixed-response questionnaire, everything they ate at breakfast, lunch, and dinner within an hour after the meal. At the same time subjects also completed two statements assessing their general physical and emotional state. Subjects also indicated any of 12 physical symptoms, such as nausea or headache, they might have experienced before the meal. At the end of the day subjects recorded all snack foods they had eaten and completed summary statements about their impressions of the day. Results failed to show any very strong relationships among the various reports of physical symptoms and moods and subjects' assessment of how much they ate during each day. Subjects' reports of their physical symptoms and feelings were correlated with the variability in the amount of food they reported eating as well as their weight-to-height ratio. This suggests that variables that might be expected to influence patterns of eating may have their effects not on actual amount eaten, but rather on how much the meal pattern changes over time. Future analyses will focus on particular patterns of variability in the eating patterns of heavier individuals as well as the influence of physical symptoms and mood on the choice and intake of specific foods during each meal. (ABL)

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Variability of Self-Reports of Physical and Emotional Well-Being

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Variability of Self-Reports of Physical and Emotional Well-Being

The findings that we will be discussing today represent the analysis of a portion of the data collected in a larger study which was designed to explore the types and variability of patterns of tri-daily self-reports of eating habits, emotional and physical state over a 28-day period. The major goal of the full study was to examine the association of such factors as mood, presence of physical symptoms, consumption of drugs and alcohol, exercise, weight-to-height ratio, number of hours of sleep, and social context on the type and amount of foods eaten at three meals each day for a sample of normal adults. In the present report, we focus primarily on the variability of subjects' reports of their physical and emotional well-being before each meal and the association of these variables with subjects' self-reported eating habits.

Subjects kept self-report records of everything they ate for breakfast, lunch and dinner as well as their physical and emotional state before each of the three meals. The data collected in this manner were subjected to two different types of analyses. The first set of analyses examined the association of the major variables of interest by aggregating the various dependent measures over the full 28 days. Following the procedures outlined by Epstein (1979), in this set of analyses we took as our dependent measures the mean of each subject's rating over the entire study period. Although the use of this procedure is not without controversy (Day, et al, 1983), Epstein (1986) has provided convincing evidence that aggregation dramatically improves the reliability of most behavioral and personality measures. The use of aggregated measures allowed us to examine any general relationships among subjects' reports of their emotional and physical states and eating habits and to evaluate, in addition, the variability/consistency, across subjects, of these reports.

The second set of analyses examined the actual daily fluctuations in individual subjects' mood, physical state and eating patterns and attempted to identify the factors associated with such fluctuations. Except for a word or two about the kinds of factors which we are examining in this latter set of analyses, we focus in this paper only on the analyses of the aggregate measures.

Method

Subjects.

Twenty-eight subjects (8 male and 20 female) from the greater Poughkeepsie community, ranging in age from 20-72 years, responded to newspaper advertisements and flyers for the study. Subjects were paid $25 for their participation.

Procedures.

Subjects were first interviewed individually during which time the procedures of the study were explained and subjects completed a demographics and health/diet history questionnaire. For the next 28 days, subjects recorded, on a specially prepared, fixed-response questionnaire, everything they ate at breakfast, lunch and dinner within an hour of the meal. At each meal, subjects also evaluated their emotional state using a 60-item adjective checklist. (These data are not discussed in the current report.) At the same time, subjects also completed two statements assessing their general physical and emotional state. ("Before [breakfast/lunch/dinner] I generally felt: 1 = very good to 5 = very bad." "Before [breakfast/lunch/dinner] I generally felt: 1 = healthy to 5 = unhealthy."). Subjects also indicated, using a checklist, any of 12 physical symptoms, *e.g.* headache or nausea, they might have experienced before each meal. A physical symptom index was derived from these ratings by calculating the total number of symptoms reported for each meal.

At the end of each day subjects recorded all snack (non-meal) foods which they had eaten and completed three summary statements about the day: "Today was generally a: 1 = very good day to 5 = very bad day." "I felt best today in the: morning/afternoon/evening/no difference." "Today I ate more/same/less than usual." Subjects were also encouraged at all times to describe unusual events of the day in diary format.

Subjects were provided with stamped envelopes in which they returned their completed questionnaires to the researchers at the end of each of the four weeks of the study. At the end of the 28 day recording period, exit interviews were held with subjects to discuss how participation in the study might have influenced their eating habits and to ask subjects to describe their

impressions of the variability of their eating habits and physical and emotional states.

In summary, the measures which we will be exploring with you today will be the responses to the questions about general condition, health and physical symptoms before each meal and the summary questions answered at the end of the day.

Results

Aggregate measures.

In order to obtain an overall assessment of the relationships among the various measures, the average rating on each of the dependent measures over the 28 days was calculated. In order to obtain an assessment of the variability of the dependent measures over the 28 days, the variance of each subject's ratings or scores on a particular measure was calculated and treated as a new dependent measure. Pearson product moment correlation coefficients were then calculated for each of the measures with all of the other measures. All reported correlations were significant at the .05 level or better (1-tail test).

Physical symptoms before each meal.

On the average, there were no differences in the number of physical symptoms reported before any of the three meals. The average physical symptom indices for breakfast, lunch and dinner were highly positively correlated with one another (the r values ranged between .85 and .93 for these comparisons). As might be expected, each of the three physical symptom indices was also positively correlated with subjects' summary report of their day (.39 for breakfast, .45 for lunch, and .42 for dinner). Subjects' reports of good days were associated with fewer physical symptoms.

The physical symptom indices were also correlated with subjects' reports of how they generally felt before each meal and how healthy they felt before each meal. The correlation coefficients were .44 and .58, respectively, for breakfast, .42 and .54, respectively, for lunch, and .43 and .50, respectively, for dinner. Subjects tended to report fewer physical symptoms when they felt healthy and generally good.

Curiously, none of the three physical symptom indices was significantly correlated with the amount subjects reported eating during the day. However, the variability in the amount subjects reported eating during the day was correlated with the variability of each of the three physical symptom indices (.41, .46 and .32 for breakfast, lunch and dinner, respectively). Thus, subjects who had the highest variability in their reports of how much they ate each day also had the highest variability in their physical symptom indices.

Subjects' weight to height ratio was correlated with their average physical symptom index for symptoms reported before dinner only (.36). This indicates that subjects with high weight to height ratios (heavier subjects) tended to report more physical symptoms before dinner. Weight to height ratio was also correlated with the variability of all three of the physical symptom indices (.52, .47 and .57 for breakfast, lunch and dinner, respectively), indicating that heavier subjects had the highest variability in their physical symptom indices.

General feelings before each meal.

Reflecting perhaps their reports of their physical symptoms before each meal, subjects, on the average, reported feeling the best before dinner and the worst before breakfast. The differences among the ratings, however, were very slight and were not statistically significant.

As was the case with the physical symptoms, the three general feeling ratings were highly intercorrelated (.78 for breakfast and lunch, .80 for lunch and dinner, and .55 for breakfast and dinner). Each of these ratings was in turn correlated with subjects' summary report of how they felt during the day (.39, .60 and .63 for breakfast, lunch and dinner, respectively). Subjects who reported feeling good at breakfast, lunch and dinner tended to report that the day was a good one. These ratings were also correlated with subjects' ratings of how healthy they felt before each meal (.74, .48 and .55 for breakfast, lunch and dinner, respectively). Again, subjects who reported feeling healthy before each of the three meals tended to report that the day had been a good one.

Subjects' reports of how much they ate during the day were only correlated with their

ratings of how they felt before breakfast (.45). Subjects who reported feeling good at breakfast tended to report eating more than usual during the day.

Subjects' weight to height ratios were significantly correlated with the variability in their ratings of how they generally felt before each meal except dinner (the correlation coefficients were .43 and .39 for breakfast and lunch, respectively). The correlation between weight to height ratio and the general feelings before dinner rating approached but did not reach conventional levels of statistical significance (.29, p. < .07). The significant correlations for weight to height ratio here indicate that heavier subjects tended to have higher variability in their reported feelings before breakfast and lunch.

Feelings of health before each meal

There were essentially no differences among subjects' reports of how healthy they felt before each of the three meals (the mean ratings were 2.3, 2.3 and 2.2 for breakfast, lunch and dinner, respectively).

The three ratings of health before each meal were highly intercorrelated (with r values between .7 and .9) and were correlated with subjects' summary report of how they felt during the day (.46, .43 and .66 for breakfast lunch and dinner, respectively). Feeling generally good was associated with feeling healthy, as might be expected. Subjects' reports of how much they ate during the day were significantly correlated with how healthy they felt at breakfast (.41). Subjects who felt healthy at breakfast tended to report eating more than usual during the day.

Conclusions and Implications

Perhaps the most surprising feature of the present results is the failure to find any very strong relationships among the various reports of physical symptoms and moods and subjects' assessment of how much they ate during each day. It is, however, noteworthy, that subjects' reports of their physical symptoms and feelings were correlated with the variability in the amount of food they reported eating as well as their weight to height ratio. The latter findings suggest that variables that might be expected to influence patterns of eating may have their

effects not on actual amount eaten but rather on how much the meal pattern changes over time.

Future analyses of the data obtained in the present study will focus on particular patterns of variability in the eating patterns of heavier individuals as well as the influence of physical symptoms and mood on the choice and intake of specific foods during each meal. For example, we are currently conducting a series of analyses on relationships between presence or absense of menstrual symptoms and our measurements of physical, emotional and eating patterns. Preliminary results suggest that the positive correlation between weight to height ratio and our other dependent variables is exaggerated during the first three days of the menstrual period as compared with the rest of the menstrual cycle.

References

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PHYSICAL EMOTIONAL INVENTORY

(PLEASE CIRCLE THE NUMBER THAT BEST DESCRIBES YOUR GENERAL FEELINGS BEFORE EATING)

BEFORE EATING I GENERALLY FELT ; (1=VERY GOOD, 3=NORMAL, 5=VERY BAD) 1 2 3 4 5

BEFORE EATING I GENERALLY FELT ; (1=HEALTHY, 5=UNHEALTHY) 1 2 3 4 5

(PLEASE CIRCLE THE NUMBER NEXT TO ANY DESCRIPTIONS THAT APPLY TO YOUR MOOD BEFORE EATING, IF A DESCRIPTION DOES NOT APPLY CIRCLE "0". 1=SLIGHTLY OR VERY LITTLE, 5=VERY MUCH)

CLEARHEADED	0 1 2 3 4 5	ATTRACTIVE	0 1 2 3 4 5	ENTHUSIASTIC	0 1 2 3 4 5
AT EASE	0 1 2 3 4 5	HARRIED	0 1 2 3 4 5	CONFIDENT	0 1 2 3 4 5
CLEVER	0 1 2 3 4 5	DECISIVE	0 1 2 3 4 5	WORRIED	0 1 2 3 4 5
WEAKWILLED	0 1 2 3 4 5	NERVOUS	0 1 2 3 4 5	EXCITED	0 1 2 3 4 5
ANXIOUS	0 1 2 3 4 5	SECURE	0 1 2 3 4 5	BORED	0 1 2 3 4 5
RELAXED	0 1 2 3 4 5	BUSY	0 1 2 3 4 5	DETERMINED	0 1 2 3 4 5
SILLY	0 1 2 3 4 5	DEPRESSED	0 1 2 3 4 5	AMBITIOUS	0 1 2 3 4 5
HYPER	0 1 2 3 4 5	STRESSED	0 1 2 3 4 5	HIGH	0 1 2 3 4 5
PERKY	0 1 2 3 4 5	ELATED	0 1 2 3 4 5	HAPPY	0 1 2 3 4 5
SHARP	0 1 2 3 4 5	IMPATIENT	0 1 2 3 4 5	FOCUSED	0 1 2 3 4 5
HUMOROUS	0 1 2 3 4 5	SENSITIVE	0 1 2 3 4 5	FRIENDLY	0 1 2 3 4 5
RESERVED	0 1 2 3 4 5	ENTHUSIASTIC	0 1 2 3 4 5	CHEERFUL	0 1 2 3 4 5
ENVIOUS	0 1 2 3 4 5	QUIET	0 1 2 3 4 5	IMPULSIVE	0 1 2 3 4 5
VULNERABLE	0 1 2 3 4 5	PATHETIC	0 1 2 3 4 5	ANNOYED	0 1 2 3 4 5
SERIOUS	0 1 2 3 4 5	CAREFREE	0 1 2 3 4 5	SELFCONSCIOUS	0 1 2 3 4 5
LOVING	0 1 2 3 4 5	HURT	0 1 2 3 4 5	HORNY	0 1 2 3 4 5
GUILTY	0 1 2 3 4 5	IRRITABLE	0 1 2 3 4 5	IMAGINATIVE	0 1 2 3 4 5
ANXIOUS	0 1 2 3 4 5	CONFUSED	0 1 2 3 4 5	AWAKE	0 1 2 3 4 5
THIRSTY	0 1 2 3 4 5	RELAXED	0 1 2 3 4 5	DRAINED	0 1 2 3 4 5
JITTERY	0 1 2 3 4 5	STRONG	0 1 2 3 4 5	ENERGETIC	0 1 2 3 4 5
HUNGRY	0 1 2 3 4 5	WEAK	0 1 2 3 4 5	PUMPED	0 1 2 3 4 5

(FOR FOLLOWING PLEASE CIRCLE THE # OF ANYTHING YOU WERE EXPERIENCING RIGHT BEFORE THE MEAL)

1 DRUG/ALCOHOL REACTION	2 COUGHING,SORE THROAT	3 MENSTRUAL SYMPTOMS	4 NAUSEA
5 CONSTIPATION	6 DIZZYNESS	7 JITTERYNESS	8 DIARRHEA
9 ALLERGIES	10 MUSCLE PAIN	11 HEADACHE	12 OTHER

_____

FIGURE 1. THIS SECTION OF QUESTIONNAIRE WAS RESPONDED TO AT EACH MEAL

DAY SUMMARY

TODAY WAS GENERALLY A (VERY GOOD DAY) 1 2 3 4 5 (VERY BAD DAY)

I FELT BEST TODAY IN THE (CIRCLE) *MORNING AFTERNOON NIGHT NO-DIFFERENCE*

TODAY I ATE (CIRCLE) *MORE LESS THE-SAME* AS USUAL

PLEASE WRITE IN ANYTHING UNUSUAL THAT HAPPENED TO YOU TODAY BELOW.

FIGURE 2. RESPONDED TO AT END OF DAY

TABLE 1. MEAN NUMBER OF PHYSICAL SYMPTOMS BEFORE EACH MEAL

Physical Symptoms included headache, stomach ache, nausea, etc. The physical symptom indeces could range from 0 to 12 and are averaged over the 28 day period of the study.

Mean symptom indices (±SEM)

BREAKFAST	LUNCH	DINNER
.33 ± .08	.34 ± .07	.30 ± .07

Intercorrelations among meals

BREAKFAST	LUNCH	DINNER
	r=.92	r=.93
	r=.85	

Correlations with summary question asked at end of day; "Today was generally a .....1=very good day, 4=very bad day"

BREAKFAST	LUNCH	DINNER
r=.39	r=.45	r=.42

Correlations with question asked at each meal; "Before eating I generally felt....1=very good, 5=very bad"

BREAKFAST	LUNCH	DINNER
r=.44	r=.42	r=.43

Correlations with question asked at each meal; "Before eating I generally felt....1=very health, 5=very unhealthy"

BREAKFAST	LUNCH	DINNER
r=.58	r=.54	r=.50

TABLE 2. VARIANCE IN SELF REPORTED PHYSICAL SYMPTOMS

Correlations with variance of responses to question asked at end of day,"Today I ate....1=more than usual, 5=less than usual"

BREAKFAST	LUNCH	DINNER
r=.41	r=.46	r=.32

TABLE 3. CORRELATIONS WITH WEIGHT TO HEIGHT RATIO

(HEAVIER SUBJECTS HAVE A HIGHER RATIO)

Correlations with mean number of physical symptoms reported at each meal.

BREAKFAST	LUNCH	DINNER
ns	ns	r=.36

Correlations with variance of physical symptoms reported at each meal.

BREAKFAST	LUNCH	DINNER
r=.52	r=.47	r=.57

TABLE 4. MEAN RATINGS OF GENERAL FEELINGS BEFORE EACH MEAL

Question asked at each meal "Before eating I generally felt 1=verygood, 5=very bad"

Mean ratings (±SEM)

BREAKFAST	LUNCH	DINNER
2.9 ± .1	2.8 ± .1	2.7 ± .1

Intercorrelations among meals for ratings of general feelings.

BREAKFAST	LUNCH	DINNER
	r=.78	r=.63
		r=.55

Correlations with summary question asked at end of day; "Today was generally a .....1=very good day, 4=very bad day"

BREAKFAST	LUNCH	DINNER
r=.39	r=.60	r=.63

Correlations with question asked at each meal; "Before eating I generally felt....1=very health, 5=very unhealthy"

BREAKFAST	LUNCH	DINNER
r=.74	r=.48	r=.55

Correlations with variance of responses to question asked at end of day; "Today I ate....1=more than usual, 5=less than usual"

BREAKFAST	LUNCH	DINNER
r=.45	ns	ns

TABLE 5. MEAN RATINGS OF GENERAL FEELINGS OF HEALTH BEFORE EACH MEAL

Correlations with question asked at each meal; "Before eating I generally felt.... 1= very healthy, 5=very unhealthy"

Mean ratings (±SEM)

BREAKFAST	LUNCH	DINNER
2.3 ± .2	2.3 ± .2	2.2 ± .2

Intercorrelations among meals for ratings of general health.

BREAKFAST	LUNCH	DINNER
	r=.89	r=.72
		r=.86

Correlations with summary question asked at end of day; "Today was generally a .....1=very good day, 4=very bad day"

BREAKFAST	LUNCH	DINNER
r=..46	r=.43	r=.66

Correlations with variance of responses to question asked at end of day; "Today I ate....1=more than usual, 5=less than usual"

BREAKFAST	LUNCH	DINNER
r=.41	ns	ns